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NAVAL MEDICAL SURVEILLANCE REPORT

NMSR

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From the Population Health Director

CAPT Bruce K Bohnker, MC, USN (FS)

As the weather moderates in Tidewater, we watch and listen to the events from Iraq, fully aware that men and women of Navy Medicine are carrying out their missions in harm's way. World-wide NEHC has about 40 staff deployed with friends and family members of assigned personnel easily tripling that number. While the war effort has not stopped other initiatives, it has demanded enough attention to preclude full interest in other issues.

There have been several interesting developments related to the war effort. Our longstanding emphasis on improved Disease Non-Battle Injury (DNBI) surveillance has moved toward fruition, with weekly and daily reporting coming from deployed forces. The entire topic of medical surveillance has garnered more interest, and coordination between the services has improved. Enhanced post-deployment medical surveillance is a front-burner topic, as many of you are well aware. I will be attending the DoD Medical Surveillance Integrated Product Team (IPT) in May as we try to pull these programs together.

We continue our efforts toward better surveillance of reportable medical events and infectious disease issues. The Vaccine Adverse Event Reporting System (VAERS) continues to be active, though slowing down now that most of the initial surge of smallpox and anthrax inoculations are

complete. Severe Acute Respiratory Syndrome (SARS) has been prominent in the news, with the potential to affect operational forces as well as family members. The annual Tuberculosis (TB) report is almost finished, documenting another essential infectious disease surveillance program. Initiatives continue to progress toward better surveillance for injuries, laboratory results and lost work days. We have several presentations scheduled for the US Army Health Promotion Conference in Albuquerque for August which should be interesting.

With the delay of the annual workshop due to operational issues, we are moving on to plan next year's schedule. CAPT McGinnis is still working on all the pieces, but it is sure to be an excellent meeting with a great deal of new information. We anticipate it will be in March in the lovely city of Chesapeake, VA. Please mark your calendars now for that meeting.

Finally, we salute each and every one of the men and women of Navy Medicine who have done a great job in "Filling Those Muddy Boots" and supporting our President's tasking. They have responded honorably and magnificently to the call of this great Nation.

Navy Medical Surveillance Report

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Viral Gastroenteritis and Norovirus in the Department of Navy

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Introduction

Outbreaks of viral gastroenteritis (VGE) have been a huge problem in the military for many years. Of the few outbreaks that have been studied, most were caused by human caliciviruses, the original and most famous strain of these is Norwalk Virus and its relatives, now called Noroviruses (NOR). NORs were recently estimated to cause 23 million cases of illness in the U.S. each year, or two-thirds of all infectious diarrheal cases (Campylobacter was the highest bacterial agent with 2.4 million cases/yr). Although the illness is neither life-threatening nor of long duration, the outbreaks may affect and completely incapacitate huge numbers of personnel. Deployed ships in particular have been hit hard by NOR outbreaks, although ground units have also been affected. Outbreaks may originate from a meal, however, the main problem is with the person-to-person spread that follows. There is no ready treatment, but potential for the development of an oral vaccine exists.

Methods

This project was designed to: (a) establish standardized surveillance for VGE outbreaks on ships deploying worldwide and (b) provide laboratory support for those outbreaks. Laboratory support is also provided for outbreaks in any other DoD unit.

Laboratory confirmation of NOR infection is done both aboard ship during the outbreak and in the following shore-based facilities: Navy Environmental and Preventive Medicine Unit No. 6 (NEPMU-6) Pearl Harbor, HI; NEPMU-5 San Diego, CA; and the reference laboratory at Children's Hospital Medical Center, Cincinnati (CHMCC), OH. Sources of the agent are investigated as well as risk factors.

All current Senior Medical Officers (SMO) were contacted and informed of the project.

Participation was not mandatory, however each ship was asked to accept and store the outbreak kit (containing Standard Operating Procedure [SOP], specimen collection supplies, and questionnaires) in case of unforeseen need. The SOP includes two options: a full study (including collection of stool and sera, with or without an onboard lab analysis, and epidemiologic investigation of sources of agent and risk factors) and minimum participation (stool specimens are collected and saved until they can be shipped out or until the end of the deployment).

There are three main assays currently used aboard ship and at NEPMU-6 to detect NOR:

a. *Enzyme Immunoassay (EIA or ELISA) for antibody capture*: This is the simplest test and measures the patient's serum antibody titer when they are acutely ill versus two weeks later. An infection is indicated by at least a four-fold rise in the convalescent sample. A test result is yielded in 14 days.

b. *Reverse Transcriptase - Polymerase Chain Reaction (RT-PCR)*: This rapidly amplifies the viral nucleic acid so it can be detected and includes a reverse transcriptase step since NOR is single stranded RNA. Results are yielded the same day.

c. *EIA for antigen capture*: This tests for viral antigen in stool using specific antibodies. It is much simpler than RT-PCR, but is not as sensitive. Results are yielded the same day.

d. *LightCycler Assay*: We are working on possible RT-PCR using the RAPID or LightCycler, which all the study ships are placing aboard. This would allow the ships to test their own specimens, however, the procedure for RT-PCR purification from stools is much more difficult than the Bio-Warfare assays the techs use.

Outbreaks: August - December 2002

Virtually every big deck underway during this time experienced a VGE outbreak. Each outbreak and ensuing investigation, if any, is covered in the following section. Much of the information gained from these outbreaks is in the form of post-outbreak surveys and saliva samples for studying viral receptors. Stools are vital to confirm VGE as NOR outbreaks and determine the strains present. None of the outbreaks had a point source, and spread appears to be person-to-person.

USS WASP LHD 1

(8-20% Attack Rate (AR)): This outbreak occurred in the Mediterranean Sea (Med Sea) at the tail end of a Gulf deployment. The origin of this outbreak is debatable: there were some cases of VGE symptoms (here defined as nausea, vomiting, diarrhea) during the Med Sea transit after a port visit to Marmara, Turkey, however, most cases appeared during and after the next port visit to Rota, Spain. A post-outbreak investigation was done after the outbreak was over and the ship had returned to Norfolk. Surveys were completed by 760 crewmembers and 2 cc of saliva from 100, split 50-50 between previously symptomatic and asymptomatic individuals were collected. Both the surveys and saliva were collected anonymously. No stools, sera, or other part of the full study were done. Thus, the actual strain will never be known as no stools were collected. Also, the Marines and embarked Navy, which comprised 2/3 of the personnel onboard during the outbreak, were unreachable. Many of the Marines went to their own sick call on this ship, and their numbers are not known, although the worst cases are counted in the 200s. So the actual attack rate is somewhere between the 20% of the regular crew (1000) and 8% of the total personnel (2800).

USS LINCOLN CVN 72

(6.8% AR): The first cases began following a port visit to Singapore and would have continued well into the (first) Gulf operations. The majority of cases occurred in the first week of the outbreak, with 2 days of over 50 new cases

presenting exceeding the expected high of 30-35 new cases daily. Specimens were not collected. The ship's deployment has been extended indefinitely, but we will try to board in Hawaii to conduct the post-outbreak surveys and collect saliva, if permitted.

USS BELLEAU WOOD LHA 3

(3% AR): While underway off San Diego last March, with full marine complement, this ship experienced an outbreak of over 200 cases. NEPMU-5 conducted the full study (excluding the onboard lab analysis), collected stools, sera and a few saliva specimens. Another outbreak occurred in September after a Singapore port visit, while the ship was in the Gulf of Oman. It would be interesting to see if it was a different strain (presumed Singapore versus San Diego acquisition) and if the same personnel were afflicted. Stool samples were not collected. However, 100 saliva and 406 post-outbreak surveys were collected.

USS ROOSEVELT CVN 71

(9.5% AR): During a two-week underway workup off Norfolk, with full air complement, this ship experienced an outbreak of approximately 520 cases. The Roosevelt experienced a high day of 180 new cases on 17 DEC, the highest observed to date. Unfortunately, due to the holiday season many crewmembers were unavailable for the investigation (50% of total personnel). Outbreaks occurring during short underway periods are difficult to study, since many crewmembers become sick off the ship and do not report to Medical. This outbreak was reported in the news media, along with the numerous cruise ships outbreaks. Stools were collected from the last two cases on the ship, and shipped to CHMCC, where both were strongly positive for NOR. These will be split with the Centers for Disease Control and Prevention (CDC) to compare with their cruise ship strains.

USS CONSTELLATION CVN 64

(16.6% AR): This outbreak also occurred after a Singapore port visit and would have continued into Gulf operations. The high day was 157 new cases, part of a 7 day period with 50 or more new cases per day. Stools were collected and frozen.

USS GEORGE WASHINGTON CVN 73

Epidemiologic details of this outbreak are pending. No stools were collected.

Marine Corps Recruit Depot San Diego (MCRD-SD)

(288 cases): There were several outbreaks at MCRD-SD and other shore units in southern California during 2002. All were identified as having NOR present in stool specimens. In these outbreaks, our lab functioned as a clinical reference lab only, and the local preventive medicine assets conducted the investigations. A total of 44 stools were collected, with NOR detected by an EIA.

Outbreaks: January - March 2003

Due to the Persian Gulf build up, an unusually high number of large decks were deployed during this quarter. All specimens were sent to CHMCC for testing. Results are by the RT-PCR assay as this is the best for stool specimens. Note that all of the outbreaks this quarter had stool specimens collected and tested positive for NOR.

USS PORT ROYAL CG 73

(5% AR): This outbreak occurred while the cruiser was in home-port at Pearl Harbor. All three stool samples were positive for NOR.

USS DOYLE FFG 39

(10% AR): This frigate also had a "home-port" outbreak at Mayport, FL. Three stool samples were collected and shipped to CHMCC. Two of the three stools were positive for NOR. In late February, the ship saw an additional 15 cases (samples not collected).

USS CARL VINSON CVN 70

(1.9% AR): Within a week of departing Hawaii, the VINSON's SMO reported an increase in cases with VGE symptoms. The high day was 22 new cases on the sixth day. Stool samples were analyzed by CHMCC, where all 7 samples tested positive for NOR.

Marine Corps Recruit Depot-Parris Island, SC

(30.7% AR): Despite a relatively large number of cases, this outbreak was very short in duration; more likely a single meal point source than the usual person-to-person outbreak. Eight stool samples were collected, 4 of which tested positive for NOR.

Camp Pendleton Marine Corps Base

(~10% AR): CHMCC confirmed that 4 of 12 stool samples were positive for NOR. This was apparently a one-day outbreak among MCRD-San Diego recruits at Camp Pendleton participating in the Crucible. It may have been a point source outbreak or a combination of food-borne intoxication and NOR.

USS ENTERPRISE CVN 65

(4.5% AR): The ship was undergoing routine maintenance in the Hampton Roads yards, with no aircrew aboard. In-port outbreaks tend to be prolonged and this one went on for 31 days. The incidence in a single day was 17 cases occurring 24 days after the first case. Three stool specimens were collected, one of which was positive for NOR.

CENTCOM Capability

The MMART (Mobile Medical Augmentation Readiness Team) will have NOR detection capability in the field shortly, and possible support for ships in the 5th Fleet. Disease Non-Battle Injury reports from the area indicate VGE outbreaks are likely.

Neoplasms in the Navy, 1998-2000: A Descriptive Analysis of the Physical Evaluation Board Database

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Introduction

Neoplasms that occur among active duty personnel in the Navy remain a condition of interest due in part to the associated attrition and disability rates. In addition, classifying these neoplasms would provide a basis for screening and prevention programs. This analysis will characterize neoplasms in the Navy using a subset of data from the Physical Evaluation Board (PEB). The PEB is the Department of Navy's disability evaluation system that identifies career-ending illnesses occurring in the Navy.¹

PEB data from 1998 to 2000 were obtained from Navy Medical Information Management Center (NMIMC). Neoplasms were identified using the International Classification of Diseases, Ninth Revision (ICD-9) codes of 140-239. This classification includes 73 malignant site-specific groupings as well as 20 site-specific benign groupings.

Incidence rates are reported per 100,000 population and calculated by organ site as well as specific site of occurrence. The rates reported are three-year rates for the entire duration of the study. Denominator data were taken from enrollment data for active duty Navy personnel during 1998-2000. This data is available from the Defense Medical Surveillance System (DMSS) through the Defense Medical Epidemiology Database (DMED).²

Results

During the study period, 427 cases of neoplasms were identified. Eighty percent of these cases were malignant and 20% were benign. Notably, only 26% (22/85) of the benign cases were the singular diagnosis being evaluated by the PEB. 82% of the population were males; 19% were officers. The average age was 36 years with a range from 19 through 69 years. The number of individuals in each age group were similar; 28%, 33% and 38% of the total population were seen in the age groups of <30, 30-39 and equal to and

over 40 respectively. The average length of service was 12.1 years with a range from 0.1 to 33.8 years.

Overall Distribution: The four most common groupings of neoplasms were lymphatic and hematopoietic tissues (23%), benign neoplasms (20%), other and unspecified sites (13%) and genitourinary organs (12%). Figure 1 displays the overall neoplasm distribution within the population.

Rates Of Neoplasms In The Population

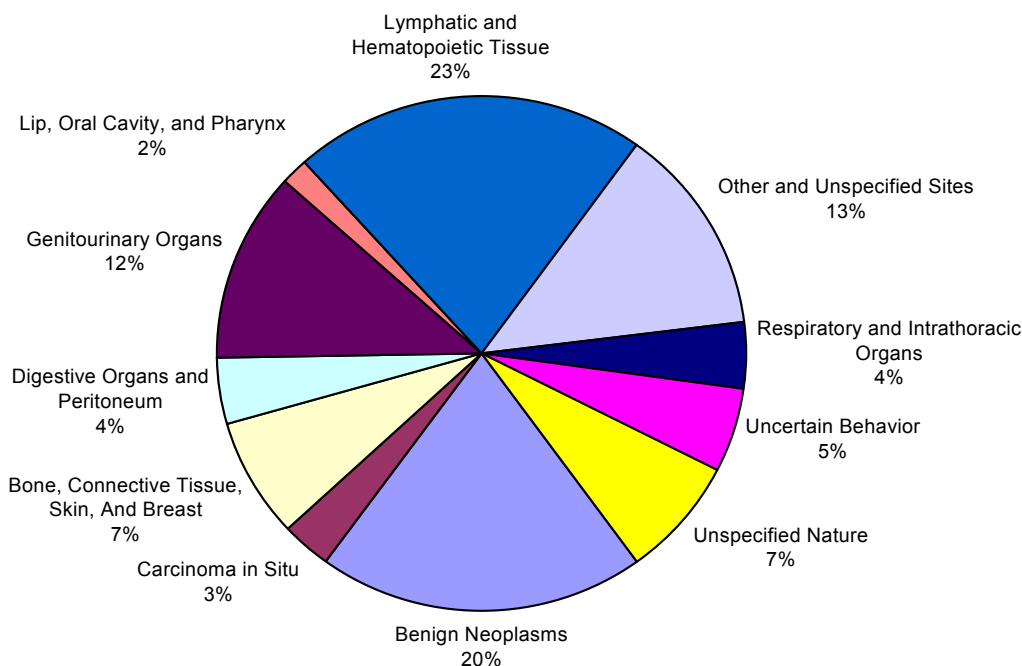
Tables 1-2 present the overall rates of select neoplasms stratified by age and gender, and Tables 4-6 list the top ten neoplasms by site of occurrence and gender. Table 3 presents the Navy population for 1998-2000.

Overall Rates: The overall rate of neoplasms in this population was 40.0 per 100,000 population with a rate of 32.0 and 8.0 for malignant and benign neoplasms respectively.

Gender: The overall rate of neoplasms per 100,000 population in males was 37.7 compared to 55.4 in females. In most categories of neoplasms, females had a higher rate excluding lymphatic and hematopoietic tissues, digestive organs and peritoneum, genitourinary organs, and lip, oral cavity and pharynx, where there were no observed cases.

Age: As expected, the overall rate of neoplasms consistently increased with age for both genders. In the age groups of <30, 30-39 and ≥40, males had rates of 19.1, 38.4, 117.0 and females had rates of 20.5, 64.3, 274.0 per 100,000 population respectively. In this population, females aged 30-39 and 40 and above have approximately double the rates of neoplasms than males in the same age groups.

Figure 1: Distribution of Neoplasms in the Navy from 1998-2000



Organ Site of Neoplasms: The overall organ site that had the highest rate of neoplasms was lymphatic and hematopoietic tissues with 8.7 per 100,000 population. Assessed by gender, males had the highest rate within the lymphatic and hematopoietic tissues, 9.3, and in females, bone, connective tissue, skin and breast had the highest rate of 12.1.

Specific Site of Neoplasm: Overall, the highest rate of neoplasms by specific site was Hodgkin's Disease, 3.3 per 100,000 population. Comparing by gender, breast neoplasms had the highest rate of 8.5 amongst females with a rate as high as 56.4 in the 40 or greater age group. In males,

Hodgkin's Disease had the highest rate of 3.5 with a rate of 4.2 in the 40 or greater age group.

Grade: Interestingly, the overall rate of neoplasms was higher among officers (53.1) vs. enlisted (37.8) despite the greater number of enlisted personnel within the population. Excluding benign neoplasms, both enlisted and officers had the highest rate of neoplasms within the lymphatic and hematopoietic tissues, 7.7 and 14.9 per 100,000 population respectively. In this population, this could be an age related phenomenon. The average age for enlisted personnel was 35.2 vs. 42.7 years old for officers.

Occupation: A wide variety of occupations were represented in the PEB data, 5.4% of records did not have a work category recorded, and these were denoted as 'missing'. The most frequent work categories observed were: Machinist's mate (5.2%), Hospital Corpsman (5.2%), Mess Management Specialist (3.8%), and Boatswain Mate (3.8%).

Command: Seventy-five percent of all neoplasm cases evaluated by the PEB during the study period were reported by Naval Medical Center Portsmouth (24%), Naval Medical Center San Diego (22%), National Naval Medical Center Bethesda (21%) and Naval Hospital Great Lakes (8%).

Discussion

The majority of the neoplasm burden within this population is due to Hodgkin's Disease. Hodgkin's Disease appears in the top five ranks when examined both by site and gender. Within genders, this burden was mostly due to breast cancer in females and Hodgkin's Disease in males. The primary neoplasm diagnoses by age groups were Hodgkin's Disease in those less than 30 years, testicular and brain cancer in those 30-39 years, and brain cancer in those 40 or older.

The rates of neoplasms in this study are lower than rates found by Hoiberg and Ernst on neoplasms in Navy personnel, although the findings are comparable.³ Similar to the present study, Hoiberg also found that the cancers in Navy personnel were mainly Hodgkin's Disease and breast cancer in males and females respectively. This analysis provides a snapshot of the neoplasms occurring in the Navy that were reviewed by the PEB. Most neoplasms should be captured, however, it is possible to miss a few cases that would not require a PEB evaluation. For instance, if a member successfully had a tumor excised, a PEB evaluation would not be warranted. It is also possible that the rates presented may be an underestimation due to the long latency period of the disease, so potential cases could have retired from the service prior to diagnosis. Of particular note, neoplasms account for only 2% of the conditions evaluated by the

PEB, the bulk of the diagnoses are related to musculoskeletal disorders.⁴

It remains important to monitor neoplasms that occur in the military due to their potential relation to occupational and environmental exposures.⁵⁻⁸ Additionally, the heavy economic burden emphasizes the need to use available resources to prevent the disease.⁹

Acknowledgement

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Table 1. Overall Rates of Select Neoplasms

Organ Site/Specific location	Overall Rates	AGE			Number of Cases
		< 30	30-39	>= 40	
Bone, Connective Tissue, Skin and Breast	3.00	1.29	3.53	11.20	32
Bone and Articular Cartilage	0.28	0.32	0.29	-	3
Connective and Other Soft Tissue	0.28	0.16	-	1.87	3
Skin	1.22	0.64	1.76	2.81	13
Unknown	0.09	-	0.29	-	1
Digestive Organs and Peritoneum	1.59	-	1.47	11.20	17
Colon	0.19	-	0.29	0.94	2
Liver and Intrahepatic Bile Ducts	0.28	-	0.59	0.94	3
Rectum, Rectosigmoid Junction and Anus	0.75	-	0.59	5.62	8
Retroperitoneum and Peritoneum	0.19	-	-	1.87	2
Stomach	0.19	-	-	1.87	2
Genitourinary Organs	4.78	2.10	4.70	19.70	51
Bladder	0.84	0.16	0.29	6.56	9
Kidney and Other Unspecified Urinary Organs	0.37	0.16	0.88	-	4
Lymphatic and Hematopoietic Tissue	8.71	5.16	8.81	28.10	93
Hodgkin's Disease	3.28	2.58	4.11	3.75	35
Leukemia (Total)	2.72	1.45	1.76	13.12	29
Lymphoid Leukemia	0.94	0.48	0.29	5.62	10
Myeloid Leukemia	1.59	0.97	1.18	6.56	17
Unspecified Leukemia	0.19	-	0.29	0.94	2
Lymphosarcoma and Reticulosarcoma	0.84	0.81	0.59	1.87	9
Multiple Myeloma and Immunoproliferative Neoplasms	0.47	-	0.29	3.75	5
Other Lymphoid and Histiocytic Tissue	1.41	0.32	2.06	5.62	15

Table 2. Select Rates of Neoplasms by Gender

Organ Site/Specific location	Overall Rates	AGE			Number of Cases
		< 30	30-39	>= 40	
Bone, Connective Tissue, Skin and Breast					
Female Breast	8.52	1.08	11.18	56.41	12
Genitourinary Organs					
Ovary and Other Uterine Adnexa	3.55	2.16	2.80	8.06	5
Uterus	0.71	-	2.80	-	1
Prostate	0.86	-	-	8.49	8
Testis	2.59	1.71	3.28	5.30	24

Table 3. Navy Population 1998-2000^a

	Total	AGE		
		< 30	30-39	>= 40
All	1,067,349	620,283	340,366	106,679
Males	926,735	527,818	304,620	94,271
Females	140,780	92,581	35,772	12,409

^aData source: AMSA (Army Medical Surveillance Activity)

Table 4. Top Ten Neoplasms by Site of Occurrence Excluding Benign Neoplasms

Rank	Specific Site (Organ Site)	Rate	Number of Cases
1	Hodgkin's Disease (Lymphatic and Hematopoietic Tissue)	3.28	35
2	Brain (Other and Unspecified Sites)	2.44	26
3	Myeloid Leukemia (Lymphatic and Hematopoietic Tissue)	1.59	17
4	Other Lymphoid and Histiocytic Tissue (Lymphatic and Hematopoietic Tissue)	1.41	15
5	Skin (Bone Connective Tissue and Breast)	1.22	13
6	Lymphoid Leukemia (Lymphatic and Hematopoietic Tissue)	0.94	10
6	Trachea, Bronchus and Lung (Respiratory and Intrathoracic Organs)	0.94	10
8	Bladder (Genitourinary Organs)	0.84	9
8	Lymphosarcoma and Reticulosarcoma (Lymphatic and Hematopoietic Tissues)	0.84	9
8	Secondary Malignant Neoplasm of Respiratory and Digestive Systems (Other and Unspecified Sites)	0.84	9

Table 5. Top Ten Neoplasms by Site of Occurrence and Gender Excluding Benign Neoplasms (Female)

Rank	Specific Site (Organ Site)	Rate	Number of Cases
1	Female Breast (Bone, Connective Tissue, Skin and Breast)	8.52	12
2	Ovary and Other Uterine Adnexa (Genitourinary Organs)	3.55	5
3	Breast (Carcinoma In Situ)	2.84	4
3	Brain (Other and Unspecified Sites)	2.84	4
5	Skin (Bone, Connective Tissue, Skin and Breast)	2.13	3
5	Hodgkin's Disease (Lymphatic and Hematopoietic Tissue)	2.13	3
5	Myeloid Leukemia (Lymphatic and Hematopoietic Tissue)	2.13	3
5	Endocrine and Nervous System (Uncertain Behavior)	2.13	3
9	Thymus, Heart and Mediastinum (Respiratory and Intrathoracic Organs)	1.42	2
9	Genitourinary Organs (Uncertain Behavior)	1.42	2

Table 6. Top Ten Neoplasms by Site of Occurrence and Gender Excluding Benign Neoplasms (Male)

Rank	Specific Site (Organ Site)	Rate	Number of Cases
1	Hodgkin's Disease (Lymphatic and Hematopoietic Tissues)	3.45	32
2	Testis (Genitourinary Organs)	2.59	24
3	Brain (Other and Unspecified Sites)	2.37	22
4	Other Lymphoid and Histiocytic Tissue (Lymphatic and Hematopoietic Tissues)	1.62	15
5	Myeloid Leukemia (Lymphatic and Hematopoietic Tissues)	1.51	14
6	Skin (Bone, Connective Tissue, Skin and Breast)	1.08	10
6	Lymphoid Leukemia (Lymphatic and Hematopoietic Tissues)	1.08	10
8	Bladder (Genitourinary Organs)	0.97	9
8	Lymphosarcoma and Reticulosarcoma (Lymphatic and Hematopoietic Tissues)	0.97	9
8	Secondary Malignant Neoplasm of Respiratory and Digestive Systems (Other and Unspecified Sites)	0.97	9

Vaccine Adverse Event Reporting System (VAERS) Update

Tables 1 and 2 display the total Anthrax and total Smallpox VAERS reports submitted through 28 March 2003, respectively. The source of this

data is the Army Medical Surveillance activity (AMSA).

Table 1. Anthrax VAERS Cumulative Data (28 August 1998 - 28 Mar 2003)

Anthrax Vaccine Immunization Program (AVIP) VAERS*					
Service	Classification				Cum. Totals
	Local Reaction			Systemic Reaction	
	Mild	Moderate	Severe		
USA	20	26	13	79	138
USN	7	13	10	59	89
USAF	31	67	39	375	512
USMC	1	9	3	20	33
USCG	0	1	0	0	1

*Excludes 4 VAERS Reports on Anthrax and Non-DoD Reports

Table 2. Smallpox VAERS Cumulative Data (07 Jan 2003 - 28 Mar 2003)

Smallpox Vaccine Program (SVP) VAERS	
Service	Cum. Totals
USA	40
USN	31
USAF	35
USMC	5

NAVAL DISEASE REPORTING SYSTEM (NDRS)**Summary of 2003 Data**

Tables 1 and 2 display the Medical Event Reports (MERs) received at Navy Environmental

Health Center (NEHC). Interested readers may calculate rates among Active Duty by dividing the

Table 1. ACTIVE DUTY Reportable Medical Events, Navy & Marine Corps, Case Frequencies, 01 Jan – 31 Mar 2003								
Disease	Total	USN	USMC	Disease	Total	USN	USMC	
Amebiasis*	0	0	0	Lyme Disease	0	0	0	
Anthrax*	0	0	0	Malaria (specify type) *	0	0	0	
Biological warfare agent exposure	0	0	0	Measles*	0	0	0	
Bites, rabies vaccine & human rabies IG	2	1	1	Meningitis (aseptic, viral)	2	0	2	
Bites, venomous animal	0	0	0	Meningitis (bacterial other than Meningococcus)	0	0	0	
Botulism*	0	0	0	Meningococcal disease*	2	2	0	
Brucellosis	0	0	0	Mumps	0	0	0	
Campylobacteriosis*	2	1	1	Occupational exposure to blood borne pathogens	0	0	0	
Carbon Monoxide poisoning*	0	0	0	Onchocerciasis	0	0	0	
Chemical warfare agent exposure	0	0	0	Pertussis*	0	0	0	
Chlamydia	412	285	127	Plague*	0	0	0	
Cholera	0	0	0	Pneumococcal pneumonia	0	0	0	
Coccidioidomycosis	2	1	1	Poliomyelitis*	0	0	0	
Cold injuries	0	0	0	Psittacosis (Ornithosis)	0	0	0	
Cryptosporidiosis*	0	0	0	Q Fever*	0	0	0	
Cyclospora*	0	0	0	Rabies, clinical human*	0	0	0	
Dengue fever*	0	0	0	Relapsing fever	0	0	0	
Diphtheria	0	0	0	Rift Valley fever	0	0	0	
E. Coli 0157:H7 infection*	0	0	0	Rocky-Mountain Spotted Fever	0	0	0	
Ehrlichiosis	0	0	0	Rubella*	0	0	0	
Encephalitis*	0	0	0	Salmonellosis*	1	0	1	
Filariasis	0	0	0	Schistosomiasis	0	0	0	
Giardiasis	2	2	0	Shigellosis*	0	0	0	
Gonorrhea	70	54	16	Smallpox*	0	0	0	
Haemophilus influenza, type b	0	0	0	Streptococcal disease, Group A	1	0	1	
Hantavirus infection*	0	0	0	Syphilis	3	2	1	
Heat injuries	2	2	0	Tetanus	0	0	0	
Hemorrhagic fever*	0	0	0	Toxic shock syndrome	0	0	0	
Hepatitis, A (acute, symptomatic only)	0	0	0	Trichinosis	0	0	0	
Hepatitis, B (acute, symptomatic only)	1	0	1	Trypanosomiasis	0	0	0	
Hepatitis, C (acute, symptomatic only)	1	1	0	Tuberculosis, pulmonary active*	0	0	0	
Influenza (confirmed)	0	0	0	Tularemia*	0	0	0	
Lead poisoning	0	0	0	Typhoid fever*	0	0	0	
Legionellosis*	0	0	0	Typhus*	0	0	0	
Leishmaniasis	0	0	0	Urethritis (non gonococcal)	19	3	16	
Leprosy (Hansen's disease)	0	0	0	Varicella	1	1	0	
Leptospirosis*	0	0	0	Yellow fever	0	0	0	
Listeriosis	0	0	0					

* Reportable with 24 hours

Data in the NMSR are provisional, based on reports and other sources of data available to the Navy Environmental Health Center. MERs are classified by date of report. Only cases submitted as confirmed are included.

frequencies by estimated mid-year strength of 383,167 for USN and 174,226 for USMC. Table

1 shows active duty only. Table 2 shows non-active duty beneficiaries.

Table 2. BENEFICIARIES Reportable Medical Events, Navy & Marine Corps, Case Frequencies, 1 Jan –31 Mar 2003								
Disease	Total	USN	USMC	Disease	Total	USN	USMC	
Amebiasis*	0	0	0	Lyme Disease	0	0	0	
Anthrax*	0	0	0	Malaria (specify type) *	0	0	0	
Biological warfare agent exposure	0	0	0	Measles*	0	0	0	
Bites, rabies vaccine & human rabies IG	2	2	0	Meningitis (aseptic, viral)	8	8	0	
Bites, venomous animal	0	0	0	Meningitis (bacterial other than Meningococcus)	0	0	0	
Botulism*	0	0	0	Meningococcal disease*	1	1	0	
Brucellosis	0	0	0	Mumps	0	0	0	
Campylobacteriosis*	0	0	0	Occupational exposure to blood borne pathogens	0	0	0	
Carbon Monoxide poisoning*	0	0	0	Onchocerciasis	0	0	0	
Chemical warfare agent exposure	0	0	0	Pertussis*	0	0	0	
Chlamydia	140	89	51	Plague*	0	0	0	
Cholera	0	0	0	Pneumococcal pneumonia	1	0	1	
Coccidioidomycosis	1	1	0	Poliomyelitis*	0	0	0	
Cold injuries	0	0	0	Psittacosis (Ornithosis)	0	0	0	
Cryptosporidiosis*	0	0	0	Q Fever*	0	0	0	
Cyclospora*	0	0	0	Rabies, clinical human*	0	0	0	
Dengue fever*	0	0	0	Relapsing fever	0	0	0	
Diphtheria	0	0	0	Rift Valley fever	0	0	0	
E. Coli 0157:H7 infection*	1	1	0	Rocky-Mountain Spotted Fever	0	0	0	
Ehrlichiosis	0	0	0	Rubella*	0	0	0	
Encephalitis*	0	0	0	Salmonellosis*	4	3	1	
Filariasis	0	0	0	Schistosomiasis	0	0	0	
Giardiasis	4	3	1	Shigellosis*	4	0	4	
Gonorrhea	10	7	3	Smallpox*	0	0	0	
Haemophilus influenza, type b	0	0	0	Streptococcal disease, Group A	1	1	0	
Hantavirus infection*	0	0	0	Syphilis	1	0	1	
Heat injuries	0	0	0	Tetanus	0	0	0	
Hemorrhagic fever*	0	0	0	Toxic shock syndrome	0	0	0	
Hepatitis, A (acute, symptomatic only)	0	0	0	Trichinosis	0	0	0	
Hepatitis, B (acute, symptomatic only)	0	0	0	Trypanosomiasis	0	0	0	
Hepatitis, C (acute, symptomatic only)	0	0	0	Tuberculosis, pulmonary active*	0	0	0	
Influenza (confirmed)	0	0	0	Tularemia*	0	0	0	
Lead poisoning	0	0	0	Typhoid fever*	0	0	0	
Legionellosis*	0	0	0	Typhus*	0	0	0	
Leishmaniasis	0	0	0	Urethritis (non gonococcal)	0	0	0	
Leprosy (Hansen's disease)	0	0	0	Yellow fever*	0	0	0	
Leptospirosis*	0	0	0					
Listeriosis	0	0	0					

* Reportable with 24 hours

Lost Duty Time Due to Injury Among Active Duty Navy and Marine Corps Personnel 2001

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Injuries are the leading health problem impacting US military service readiness today.¹ Injuries are also a considerable financial burden for the military services.² In an effort to reduce injuries and develop effective interventions, the Army Medical Surveillance Activity (AMSA) provides frequency data to capture and characterize causes of injury in active duty personnel.³ AMSA operates the Defense Medical Surveillance System (DMSS), an information system that stores inpatient and outpatient ICD-9 coded visits to shore facilities. Monthly reports on injuries are available from the AMSA website.⁴ These reports contain trends of injury hospitalizations and outpatient visits summarized by anatomical region and causal agent. This article is an overview of lost duty time due to injuries among United States Navy (USN) and United States Marine (USMC) personnel.

Methods: Injuries, specified by ICD-9 diagnosis codes, resulting in hospitalization or outpatient care for calendar year 2001 were received from AMSA; psychological trauma and poisoning are not included.⁵ Lost duty injuries are calculated as hospitalization or sick in quarters. Limited duty injuries are calculated as return to duty with limitations.

Results: Figure 1 illustrates the trends in lost duty days due to injury resulting in hospitalization during 2001. Both USN and USMC peaked in summer months (July- August 2001). Figure 2 shows the trends of clinic visits due to injuries resulting in light duty status; in general, there appeared to be a declining trend throughout the year. The USMC showed a much higher frequency of clinic visits resulting in light duty than the USN. Figure 3 illustrates the trends of clinic visits due to injuries resulting in sick in quarters. The USN showed an apparent decline while the USMC appeared fairly stable.

Table 1, 2, and 3 describe the injuries resulting in hospitalization, sick in quarters, and light duty disposition by anatomical region. Injuries to the trunk, head and neck, and leg are the top three

leading causes of injuries resulting in hospitalization (bed days) among both USN and USMC. Unspecified regions, knee, and foot and ankle injuries are among the top three leading causes of clinic visits resulting in light duty status among USN and USMC. Trunk, unspecified, and head and neck injuries are the top causes of clinic visits resulting in sick in quarters for the USN and USMC. Injuries to the trunk showed the highest percentage resulting in hospitalization (bed days) at 21.9% among USN, and the leading cause of sick in quarters among both military services (USN-32.5%, USMC-19.5%). Unspecified injuries were the leading cause of clinic visits resulting in light duty status among USN (23.9%) and Marines (21.7%).

Discussion: USN population (377,810, FY 2001) is two times the size of USMC population (172,934, FY2001).⁶ Trends in this analysis indicate that the USMC had a higher frequency of injury clinic visits resulting in hospitalization (bed days) throughout the year in comparison to the USN. The trend was even more apparent for clinic visits resulting in light duty due to injuries. These data have some limitations that should be noted. First, sick call reports onboard vessels, where more USN personnel are stationed compared to USMC personnel, are not included in this analysis, indicating that reporting bias may have been introduced. However, sick call reports from Battalion Aide Stations, which cater to Marine Corps field/training operations, are also not included in this analysis. Therefore, it is expected that both USN and USMC data are underreported in this analysis. Second, this analysis reports frequencies, not rates, limiting the ability to compare across services. A comparison of injury rates between Navy and Marine Corps should be explored to better understand this burden in both services.

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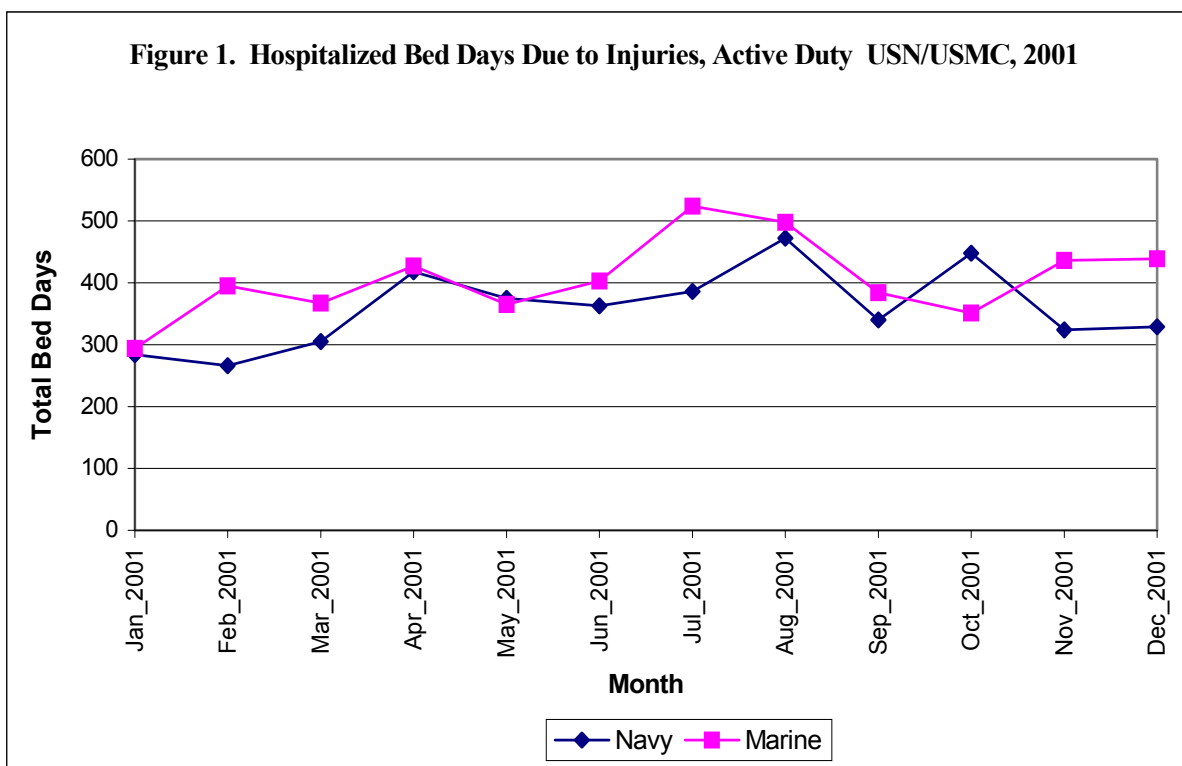


Table 1. Hospitalized Bed Days Due to Injuries by Anatomical Region among Active Duty USN/USMC in 2001

NAVY			MARINES		
Region	# of Visits	% of Visits	Region	# of Visits	% of Visits
All Injuries	4310	100.0	All Injuries	4883	100.0
Trunk	942	21.9	Head and Neck	1174	24.0
Head and Neck	929	21.6	Trunk	971	19.9
Leg	578	13.4	Leg	746	15.3
Shoulder and Arm	508	11.8	Shoulder and Arm	527	10.8
Knee	498	11.6	Foot and Ankle	458	9.4
Foot and Ankle	377	8.7	Knee	370	7.6
Hand and Wrist	222	5.2	Hand and Wrist	275	5.6
Unspecified	175	4.1	Environmental	210	4.3
Environmental	81	1.9	Unspecified	152	3.1

Figure 2. Clinic Visits Due to Injuries Resulting in Light Duty, Active Duty USN/USMC, 2001

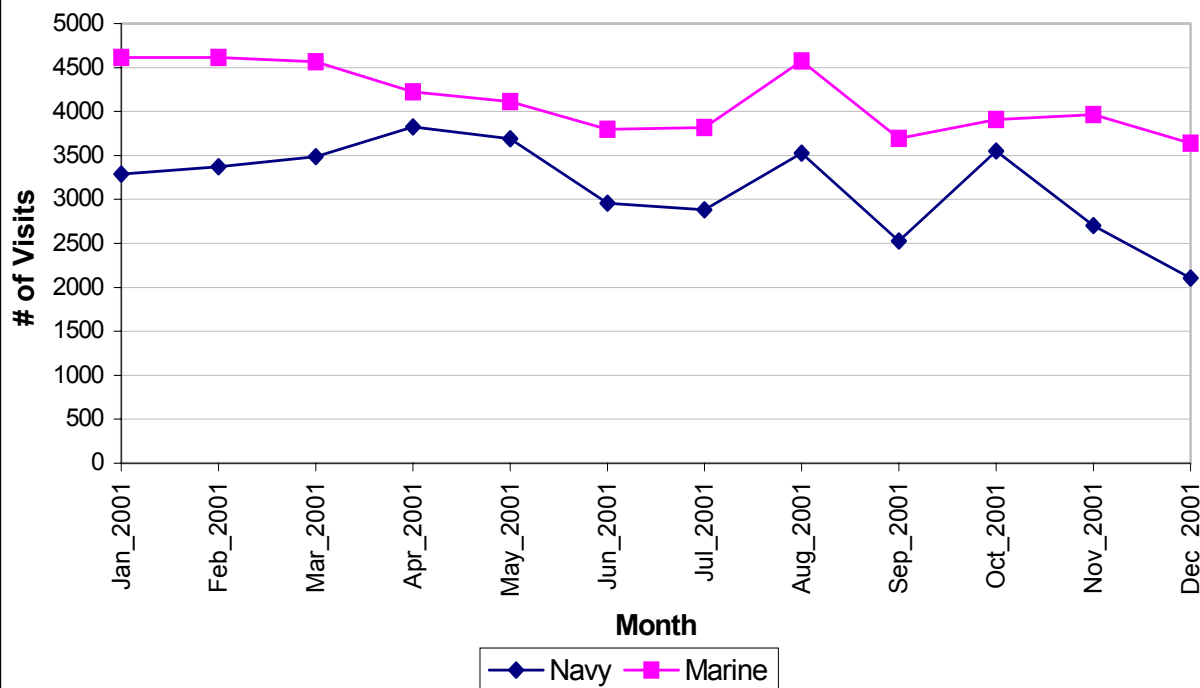


Table 2. Clinic Visits Resulting in Light Duty Status Due to Injuries by Anatomical Region among Active Duty USN/USMC in 2001

NAVY			MARINES		
Region	# of Visits	% of Visits	Region	# of Visits	% of Visits
All Injuries	37921	100.0	All Injuries	49532	100.0
Unspecified	9067	23.9	Unspecified	10758	21.7
Knee	7564	19.9	Knee	10652	21.5
Foot and Ankle	6547	17.3	Foot and Ankle	10264	20.7
Shoulder and Arm	5163	13.6	Shoulder and Arm	5646	11.4
Trunk	3978	10.5	Trunk	3989	8.1
Hand and Wrist	3254	8.6	Leg	3877	7.8
Leg	1311	3.5	Hand and Wrist	3075	6.2
Head and Neck	877	2.3	Head and Neck	1001	2.0

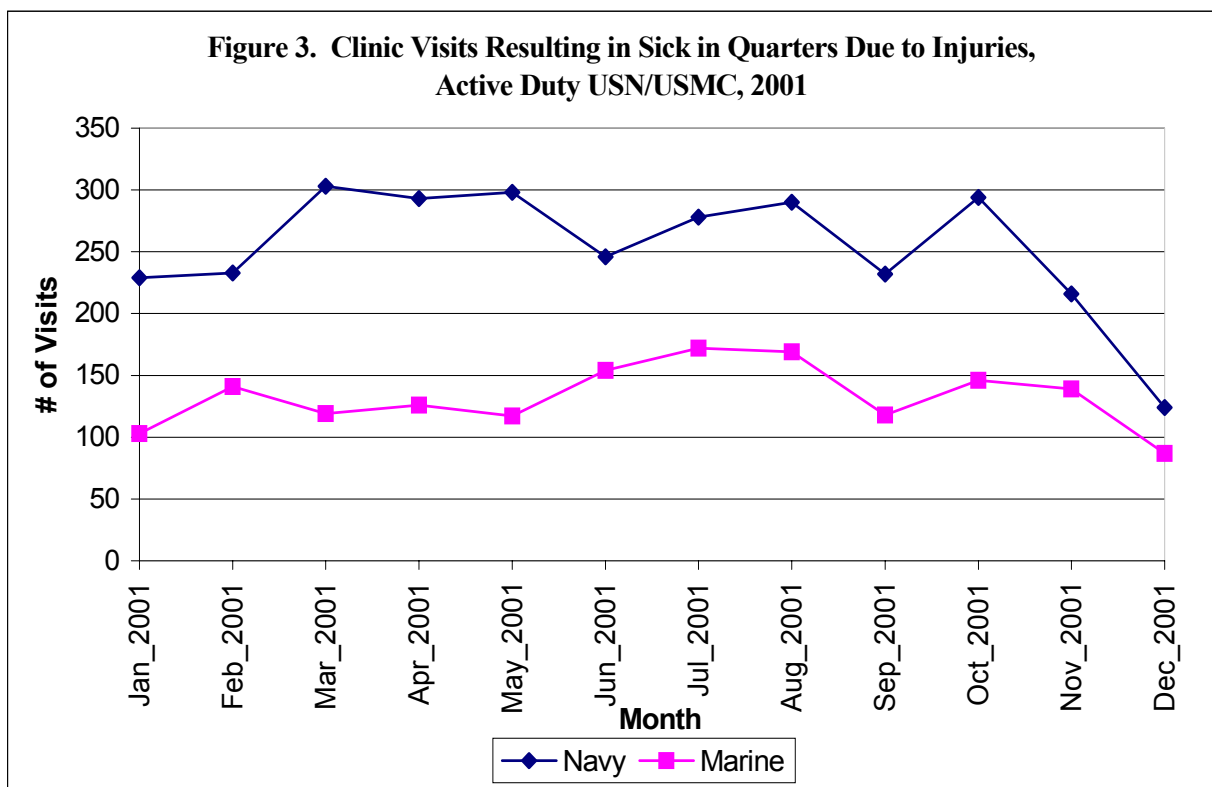


Table 3. Clinic Visits Resulting in Sick in Quarters due to Injuries by Anatomical Region among Active Duty USN/USMC in 2001

NAVY			MARINES		
Region	# of Visits	% of Visits	Region	# of Visits	% of Visits
All Injuries	3036	100.0	All Injuries	1591	100.0
Trunk	987	32.5	Trunk	310	19.5
Unspecified	727	23.9	Unspecified	273	17.2
Head and Neck	434	14.3	Head and Neck	251	15.8
Foot and Ankle	342	11.3	Foot and Ankle	242	15.2
Shoulder and Arm	172	5.7	Shoulder and Arm	141	8.9
Knee	123	4.1	Environmental	130	8.2
Hand and Wrist	92	3.0	Hand and Wrist	92	5.8
Environmental	82	2.7	Knee	90	5.7

HIV Seroconversion Among Active Duty Sailors and Marines, 1985-2001

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Introduction

Human Immunodeficiency Virus (HIV) is a public health threat continuing to affect the health and readiness of U.S. Naval forces. The Department of the Navy began testing all active duty military personnel for HIV in 1985. Since then, there have been 4,786 documented cases of HIV infection among U.S. Navy and Marine Corps active duty personnel. The total force screening program goal was to test all active duty members at least once within the first 2 years, and again during the next 2 years. Tests are performed in accordance with Department of Navy policy.¹

Results

Incidence

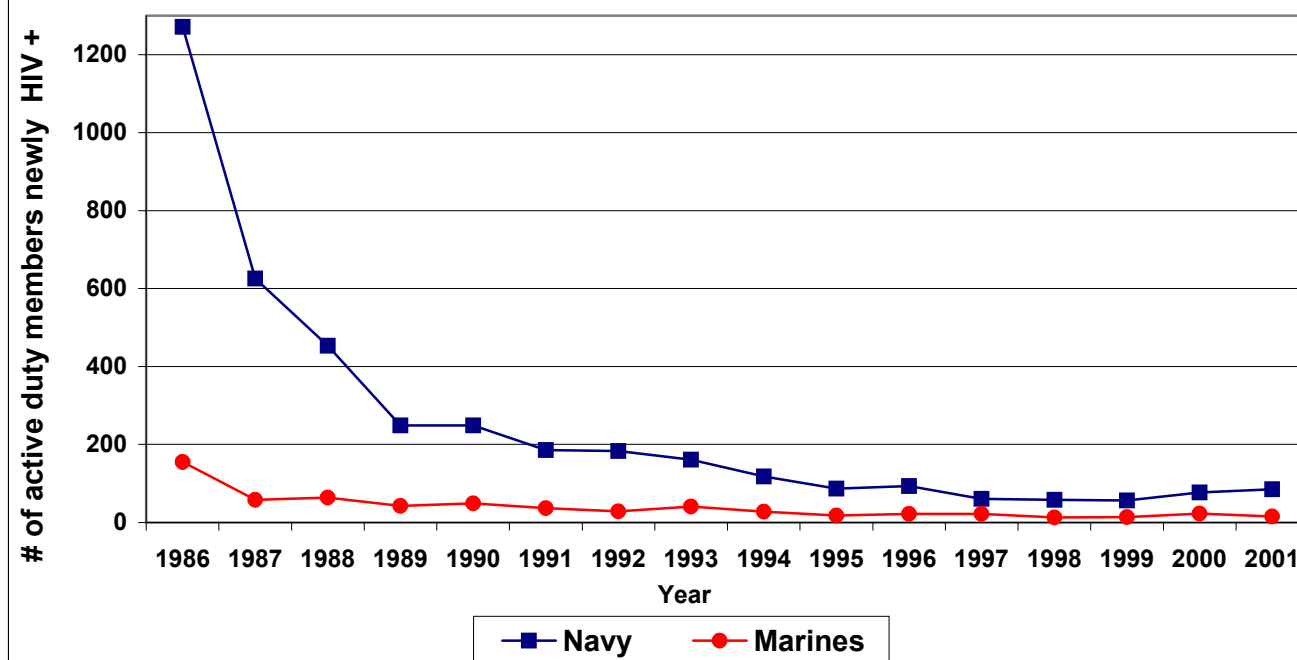
During calendar year 2001, 357,470 active duty Sailors, and 142,957 active duty Marines were

tested for HIV antibodies. Of these, 101 active duty Sailors and Marines tested positive for HIV (Table 1). Data on newly identified cases of HIV infection among active duty Sailors and Marines from 1986-2001 are shown in Figure 1. Since 1985, there have been 4,786 documented cases of HIV infection among active duty Sailors and Marines.² Note that Figure 1 plots newly identified infections, not necessarily newly acquired infections. The distinction is important, particularly prior to 1990, where the number of positive members is more an indication of prevalence. Predictably, the first few years of testing identified higher numbers of HIV positive members. Since all new accessions into the Navy and Marines have been screened for HIV infection (and people who are positive at that time are excluded), the number of HIV infections identified after 1989 is more an indication of newly acquired infections (annual incidence).

Table 1. Number of Newly Identified HIV Positive Active Duty Members and Seroconversion Rates, Navy and Marines, 1990-2001

Year	Newly Identified HIV Positive Cases		Seroconversion Rate (per 100,000 members tested)	
	Navy	Marines	Navy	Marines
1990	249	49	55	28
1991	186	37	50	26
1992	183	29	47	20
1993	161	41	38	25
1994	118	28	30	17
1995	87	18	23	11
1996	94	22	26	14
1997	61	22	17	13
1998	58	13	17	8
1999	57	14	16	10
2000	77	23	21	16
2001	85	16	24	11

Figure 1. Newly Identified HIV Positive Active Duty Members Navy and Marines, 1986-2001



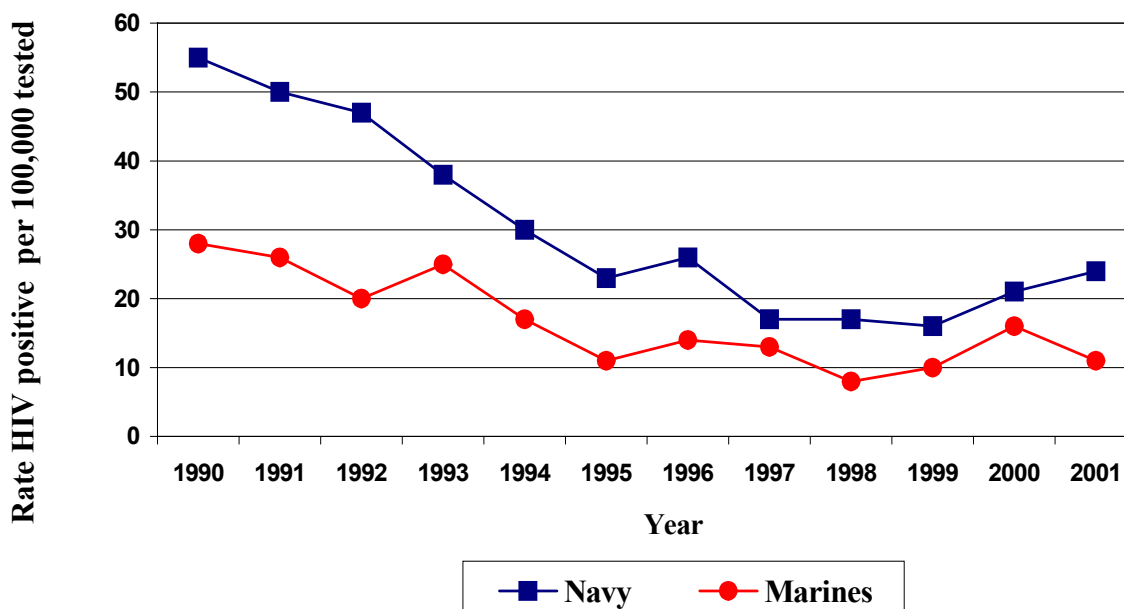
HIV seroconversion rates (cases per 100,000 members tested) among active duty Sailors and Marines from 1990-2001 are shown in Figure 2. Among active duty Sailors, there was an overall decline in the infection rates, with a slight increase during 1999-2001 of 16 to 21 to 24. Among Marines, the rate fell from 16 in year 2000 to 11 in year 2001.

Trend analysis was performed utilizing a 95% confidence level and examining two different time frames. The first analysis examined the trend from 1993 to 2001. It is assumed that all seroconverters since 1993 clearly represent incident cases. To examine the trends, three-year averages were utilized (1993-95, 1996-98, and 1999-2001) to minimize fluctuations due to small case

numbers. In the Department of Navy, there was a significant decrease in the number of new HIV positive service members (Sailors and Marines) from 1993 to 2001 ($X^2=9.305$, $p=0.002$). Examining the trend only among Sailors, there is also a significant decrease ($X^2=7.879$, $p=0.005$). There were no significant fluctuations among Marines.

The second analysis examined trends in the number of new cases from 1999 to 2001. Seroconversion rates among Marines were relatively stable. However, a significant increase in HIV seroconversion rates was observed among Sailors from 1999 to 2001 ($X^2=4.731$; $p=0.03$). These rates demonstrate that the HIV epidemic continues to affect the active duty force.

Figure 2. HIV Seroconversion Rates per 100,000 Tested Navy and Marines, 1990-2001

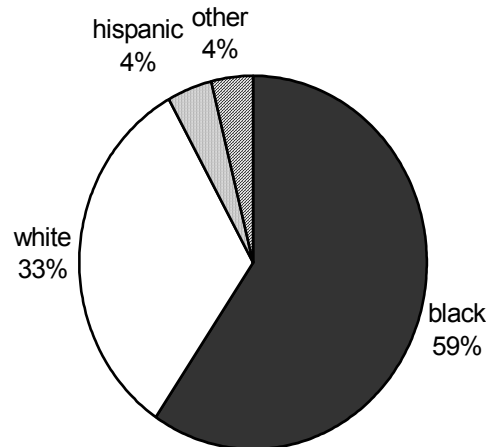


Race

Racial groupings of the 101 active duty Sailors and Marines newly identified as HIV positive in 2001 are shown in Figure 3. These data are similar to those seen during the previous year for both Sailors and Marines. Black Sailors, who constituted 19% of the total active duty Navy personnel, continued to be disproportionately affected.³ Seroconversion rates by race among Navy enlisted members in 2001 further reveal this disparity. Overall, the rate for enlisted Sailors was 30 per 100,000 members tested, with rates of 88 for black Sailors, 18 for "other" race Sailors, and 14 for white Sailors. Black Marines, who constituted 15% of the Marine Corps, also continued to be disproportionately affected by HIV. Overall, the rate was 16 per 100,000 enlisted Marines tested, with rates of 50 for black Marines, 12 for "other" race Marines, and 6 for white Marines. All newly HIV positive Marines were male in 2001. A similarly disproportionate racial distribution is seen in the general United States population where black Americans accounted for 54% of the estimated 40,000 new

HIV infections in 2000, though black Americans comprised only 13% of the general population.⁴ According to the Centers for Disease Control and Prevention (CDC), the disproportionately high incidence rate among this minority group in the United States is due to either a higher prevalence of at-risk behaviors for HIV infection, a higher prevalence of HIV infection within the minority population, or a combination of these factors.⁵ In the U.S. Department of Health and Human Services' Healthy People 2010, a ten-year strategy for improving the Nation's health, several strategies focus on reducing transmission of HIV, including addressing the disproportionate impact among racial and ethnic groups.⁸ Healthy People 2010 suggests that prevention efforts take into account multiracial/cultural aspects and include socio-economic issues such as poverty, underemployment and access to health care. Black Sailors and Marines remain disproportionately affected despite the fact that this population receives equivalent pay and health care access as their white counterparts. This suggests these socioeconomic factors are not primary determinants of HIV risk in this population.

Figure 3. Newly Identified HIV Positive Sailors and Marines, by Race, 2001



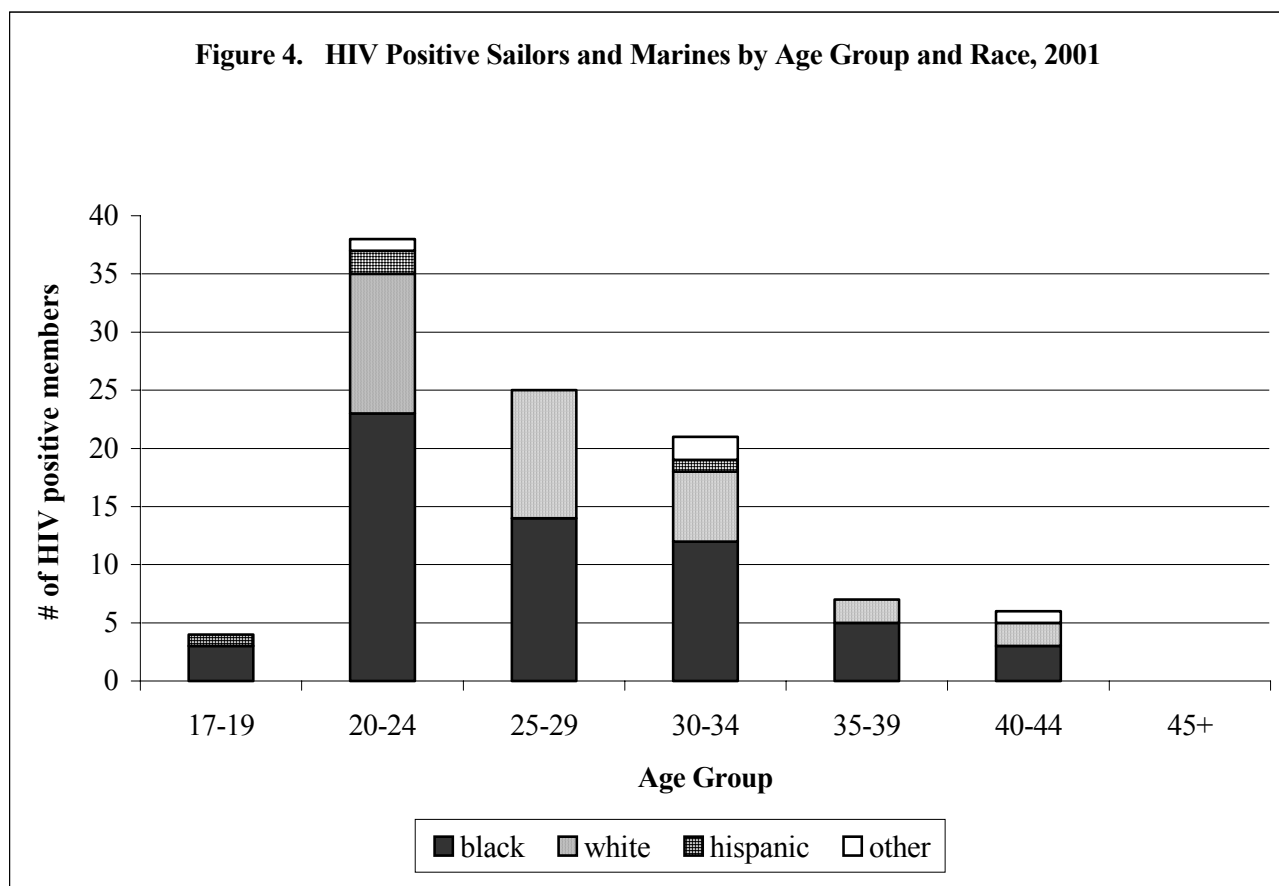
Gender

Four female Sailors tested HIV positive in 2001. These represent 5% of new HIV infections (up from 4% in 2000). Nationally, 25% of new HIV infections in 2000 were women.⁵ The difference in gender proportion between the United States general public and the Navy is worth noting. While about 50% of the United States population aged 18-45 was female in 2000, only 15% of Sailors were women. The CDC estimates that 64% of HIV infections among American women in 2000 were acquired through heterosexual contact.⁵ Overall, female enlisted Sailors were less likely than males to have been infected with HIV (males 33 per 100,000, females 10 per 100,000).

Age

Age and racial groupings of the 101 newly identified HIV positive active duty Sailors and Marines are shown in Figure 4. The largest age group of newly infected Sailors and Marines was the 20-24 year old group (38 of 101; 38%). Approximately 66% of newly infected Sailors were under age 29 and seventy-five percent of newly infected Marines were also under age 29. This would suggest that for both Navy and Marine Corps, the greatest at-risk group for HIV infection are those individuals 29 years or younger.

Figure 4. HIV Positive Sailors and Marines by Age Group and Race, 2001



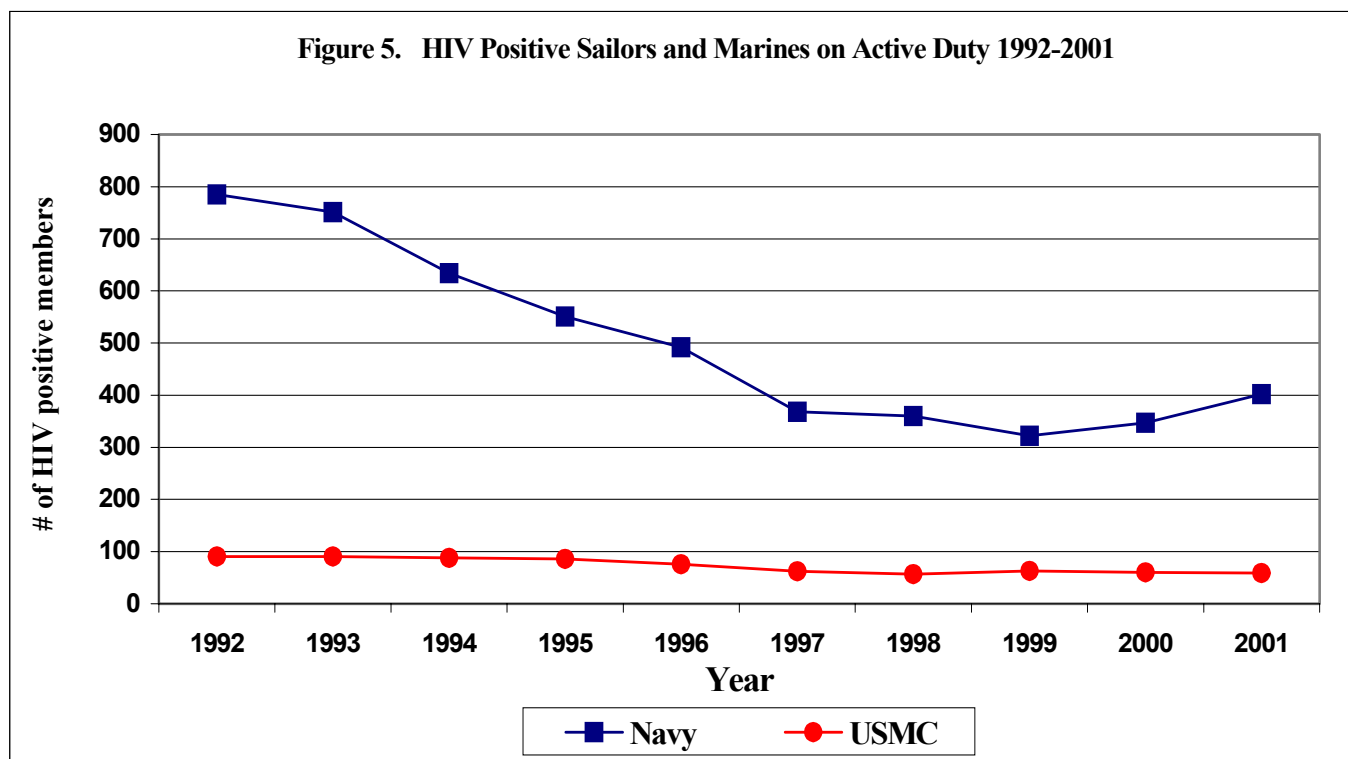
Prevalence

The numbers of HIV positive Sailors and Marines on active duty by year from 1992-2001 are shown in Figure 5. HIV positive members are retained on active duty provided they show no evidence of clinical illness or immunologic/neurologic impairment related to their HIV infection.⁶ These members are assigned only within the United States (including Hawaii, Alaska, and Puerto Rico) to a unit not normally programmed for deployment, within 300 miles of a Naval Medical Treatment Facility. Combination drug therapies to improve the health of HIV positive members may have contributed to the “leveling off” seen in 1997-98 and subsequent increases in numbers of HIV positive Sailors and Marines on active duty.

Condom Use

A health risk behavior survey conducted in 1995 and 1998 assessed self-reported condom use at last sexual encounter by unmarried active duty.⁷ It was found that condom use at last sexual encounter among sexually active unmarried Sailors dropped from 42.9% to 38.9% (lowest in DoD) from 1995 to 1998; the rate among Marines (42%) remained unchanged. These rates are lower than the Department of Health and Human Services Healthy People 2010 goal for condom use at last sexual encounter of 50% or more.⁸ Sexual abstinence or long-term mutual monogamy between two uninfected people are safe options to avoid HIV infection. For people who decide to have sex outside a monogamous relationship, the correct and consistent use of latex condoms during sexual intercourse - vaginal, anal, or oral - greatly reduces a person's risk of acquiring or transmitting HIV.⁹

Figure 5. HIV Positive Sailors and Marines on Active Duty 1992-2001



Conclusions

The numbers and rates of new HIV seroconverters have significantly declined since 1990, but there appears to be a slight increase in both cases and rates since 1999. Like HIV incidence in the U.S. general population, in 2001 black men (Sailors and Marines) were disproportionately affected. Within the general population, socioeconomic status, substance abuse and healthcare access have been linked to HIV infection risk. These factors do not explain the increased infection rates among black active duty members for whom such disparities are absent. The majority of new seroconverters are younger than 30 years old, though age adjusted rates indicate a higher infection rate among military personnel 30 and older. Condom use by unmarried Sailors and Marines remains below the national goal of 50%.



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